3D Holographic eyes at CEBIMAr
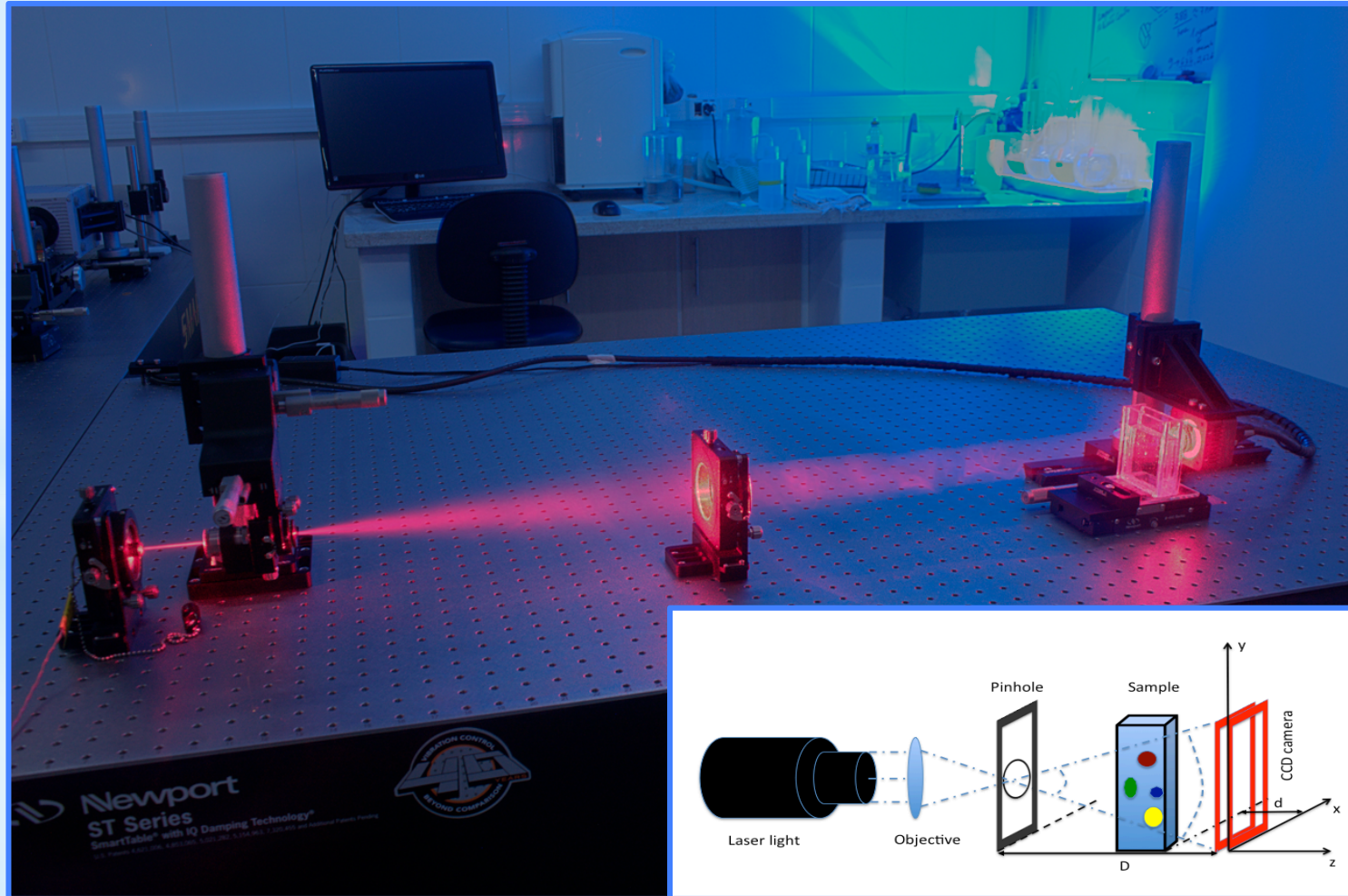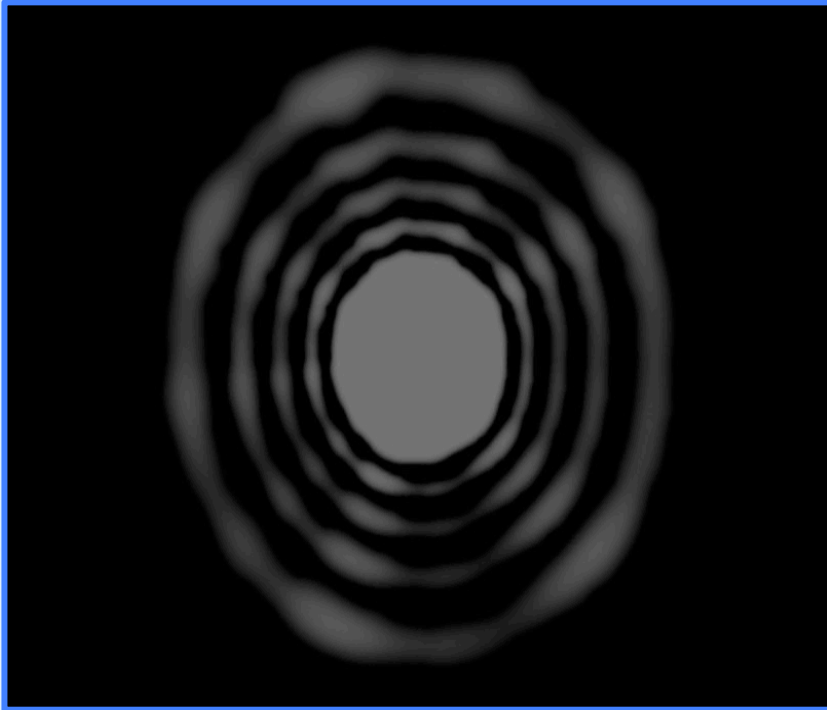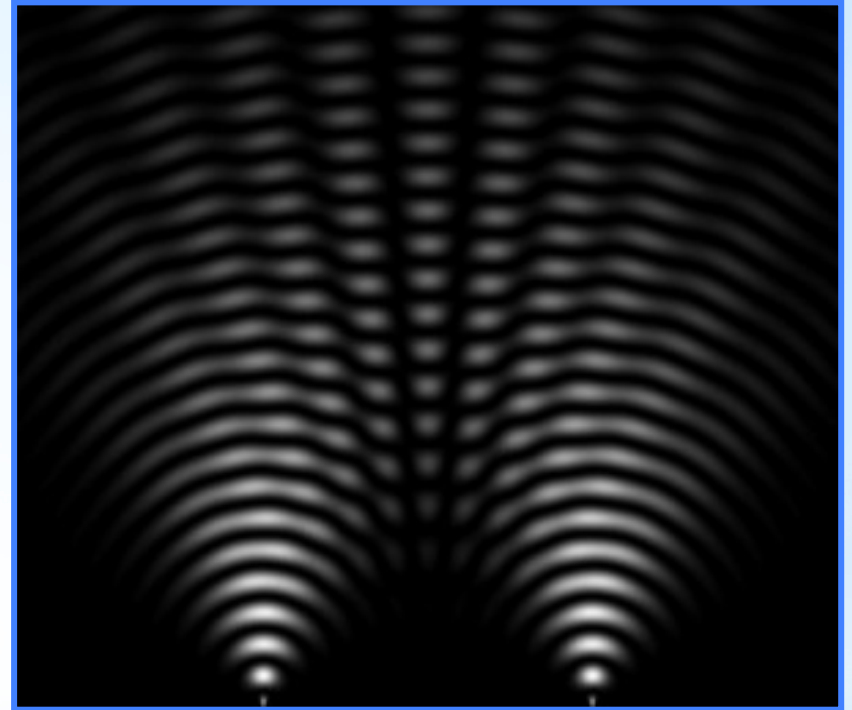

22-01-2013

Holography is...

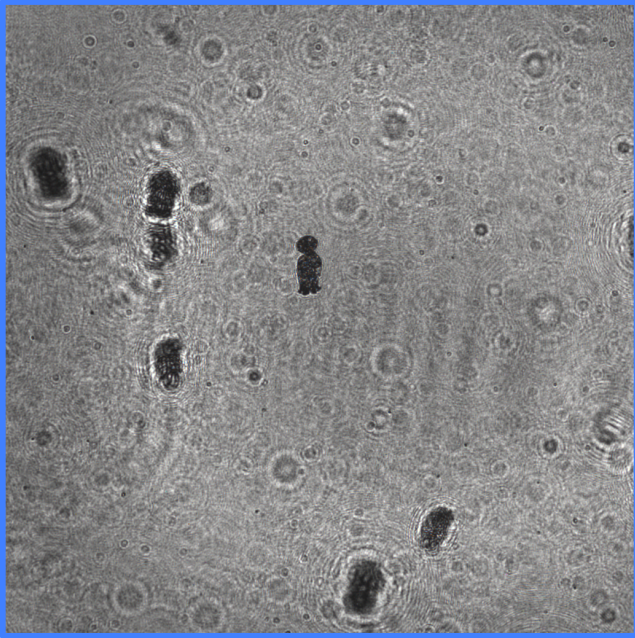**Diffraction** + **Interference**

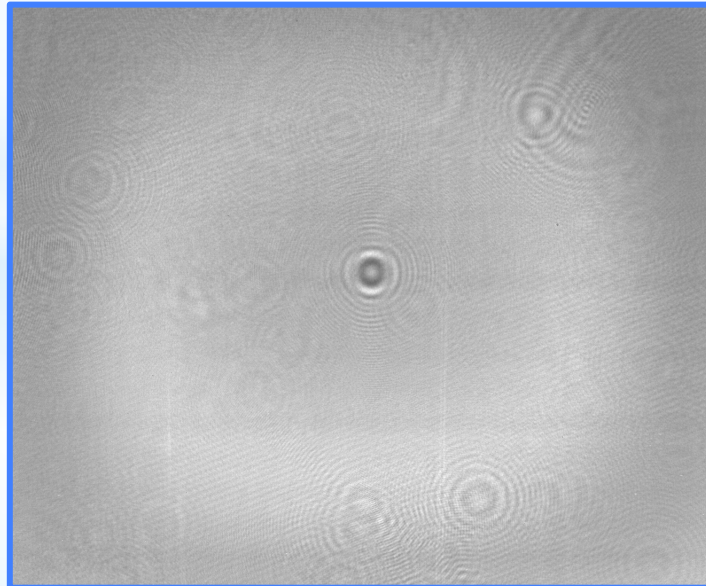$$I_H\left(x, y\right) = \left(R + O\right)\left(R + O\right)^* = |R|^2 + |O|^2 + R^*O + RO^*$$
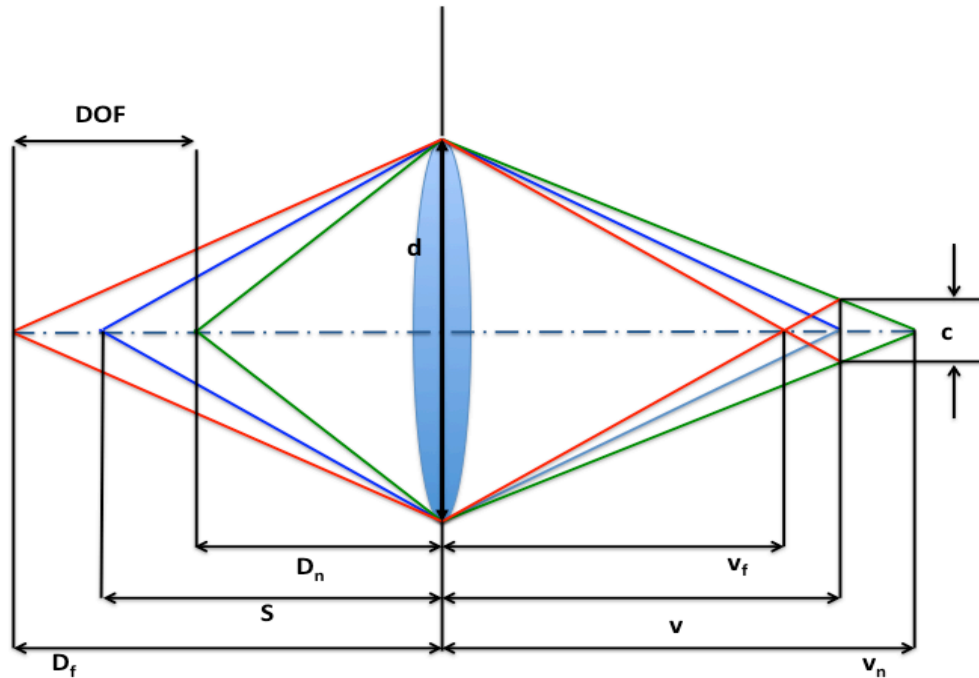
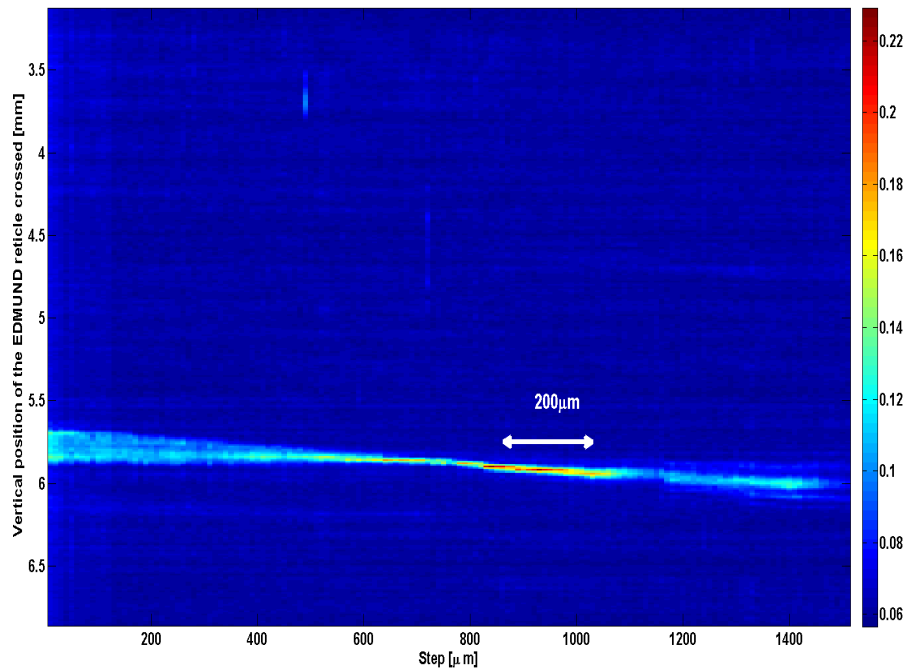## Microscopy 3X

Phase microscopy 3X
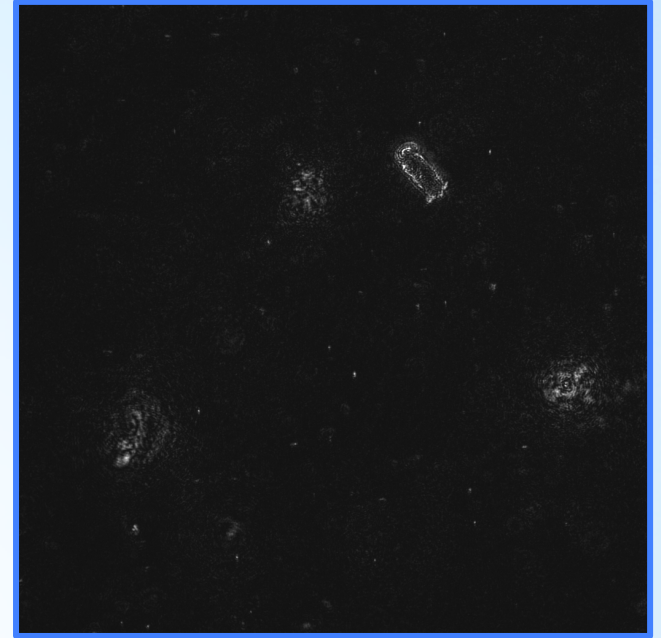
Holographic image

Deep of focus

$$DOF = \frac{2f(m+1)/m}{fm/(Nc) - (Nc)/fm}$$

DOF

d

c

D_n

v_f

S

v

D_f

v_n

DOF experimental measure

Vertical position of the EDMUND reticle crossed [mm]

200μm

Step [μm]

PhaseMicroscopy

Input parameters

LENS MODEL

Mounted

PLOT

CAMERA MODEL

PHOTON FOCUS

Magnify X5

Frame per second

108

LENS DIAMETER (mm)

14.87

f# number

5

Focal distance (cm)

75.2

DOF vs. magnification

DOF [mm]

Camera distance [m]

magnification [X]

Flux rate vs. magnification

flux [ml/s]

magnification [X]
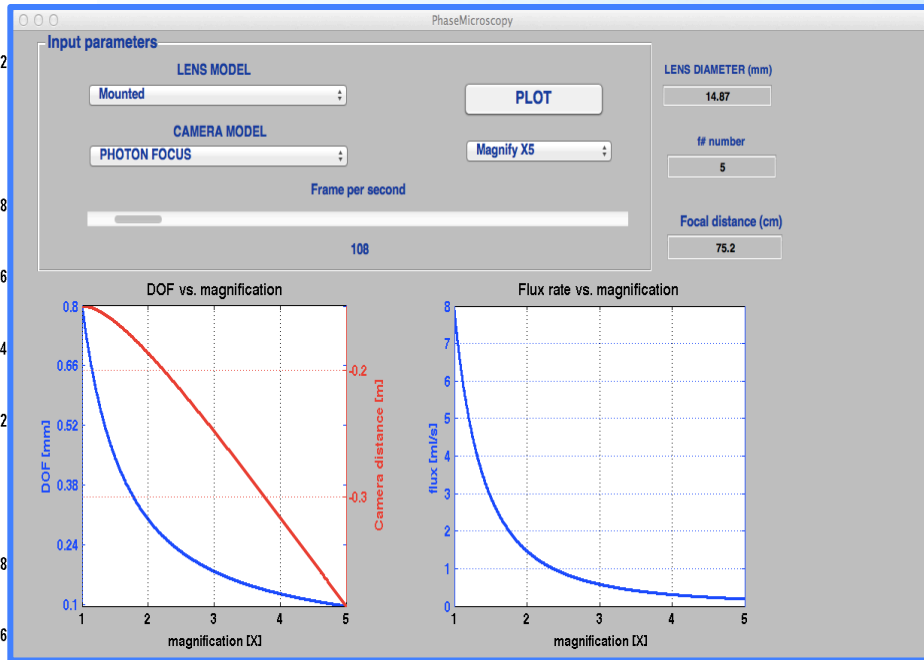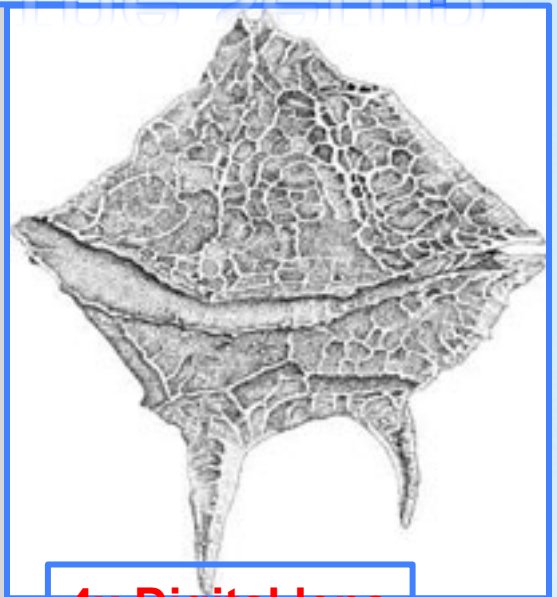
Ergonomic Holography
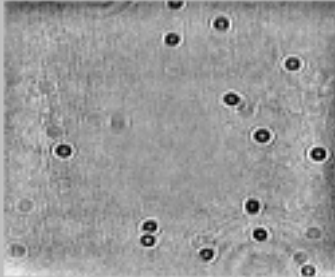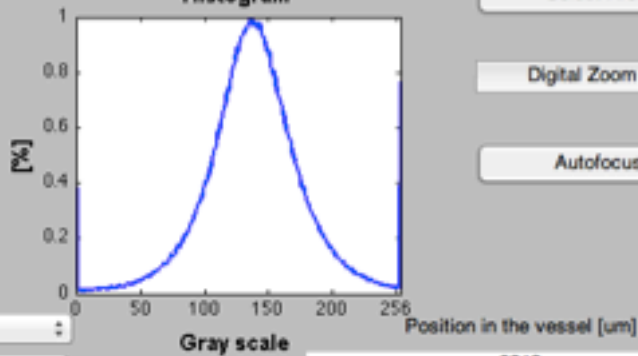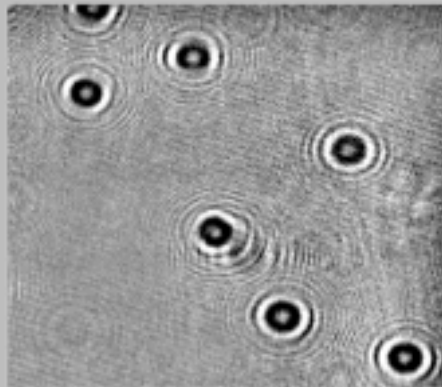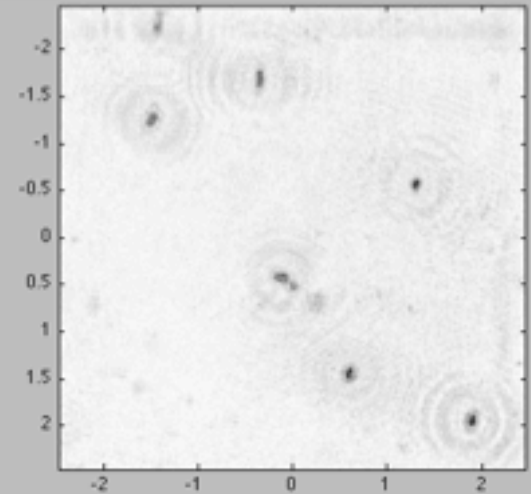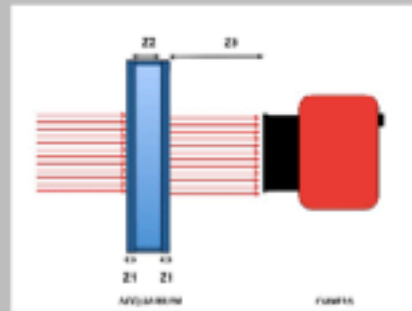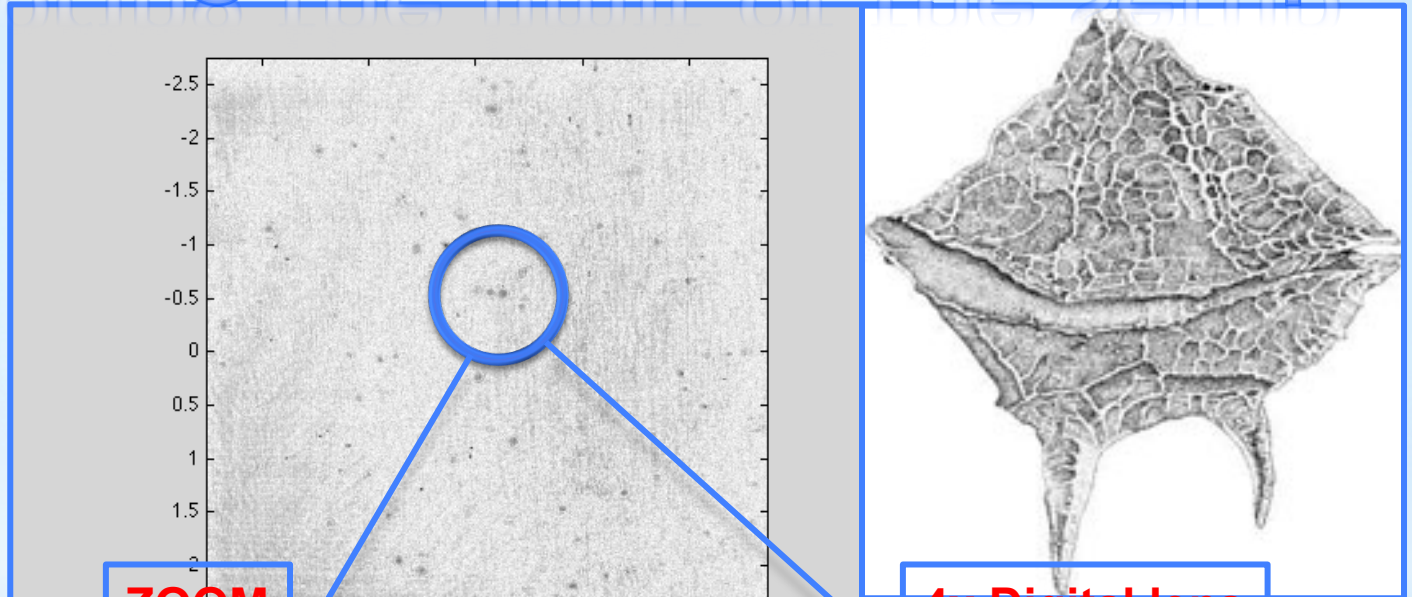
Holography processing
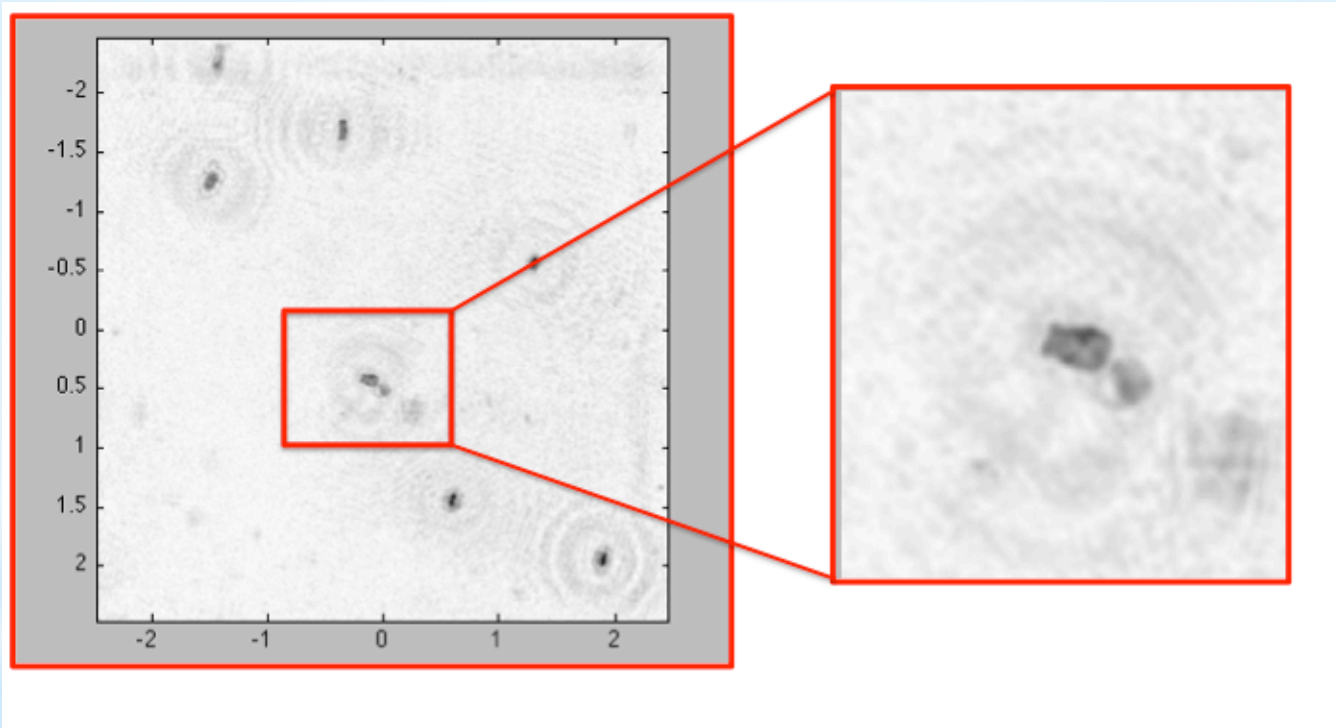
Digital zoom
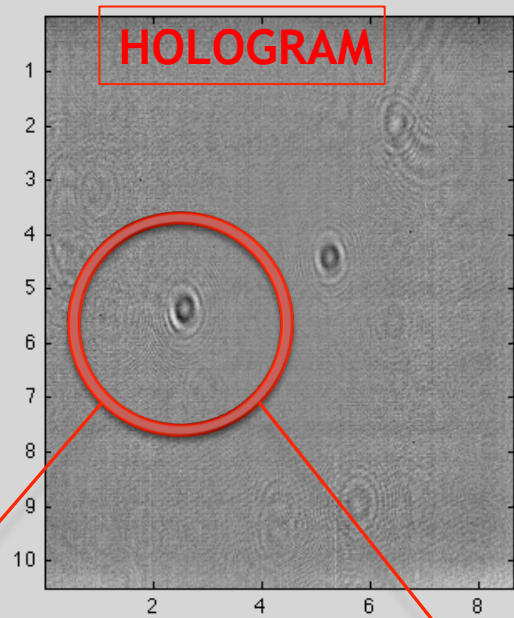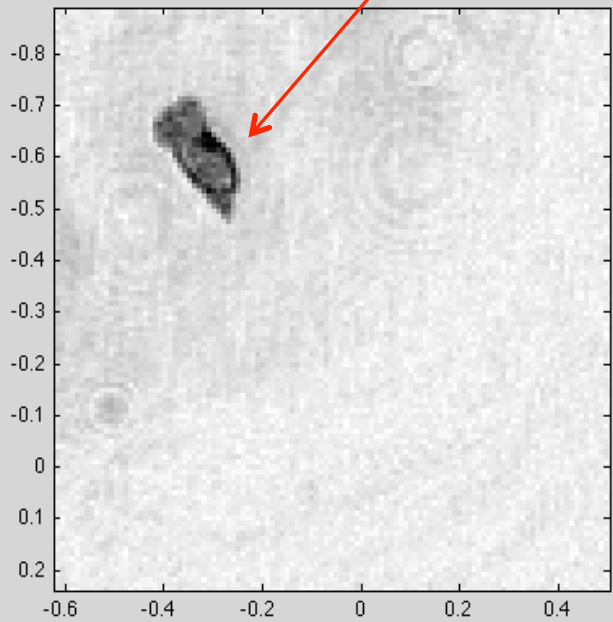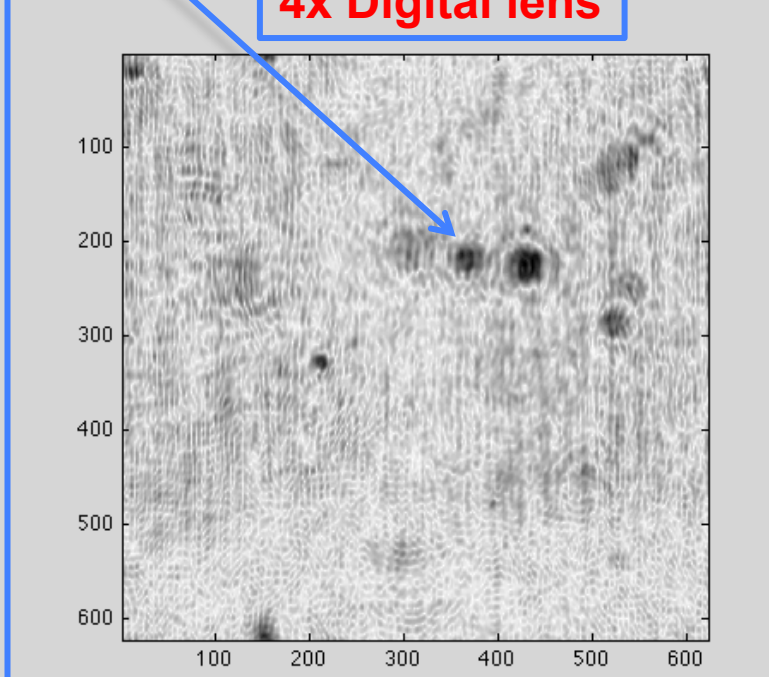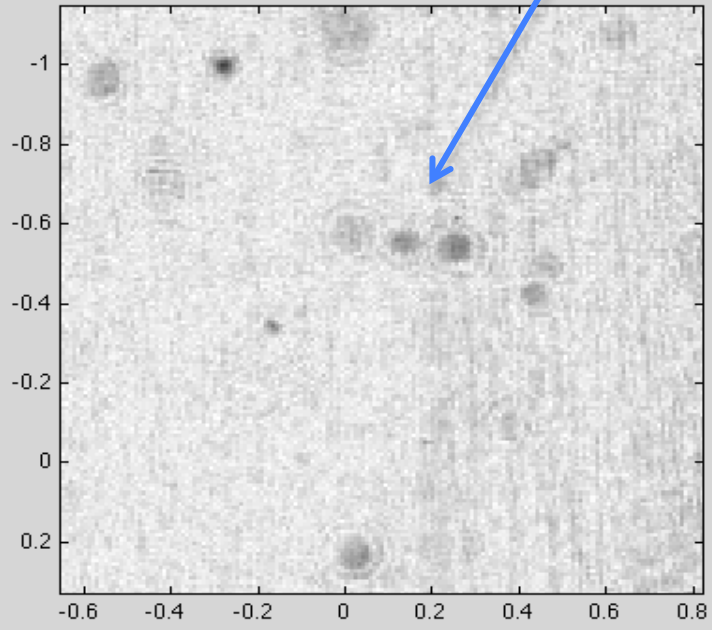
HOLOGRAM

ZOOM

ZOOM 4.8X
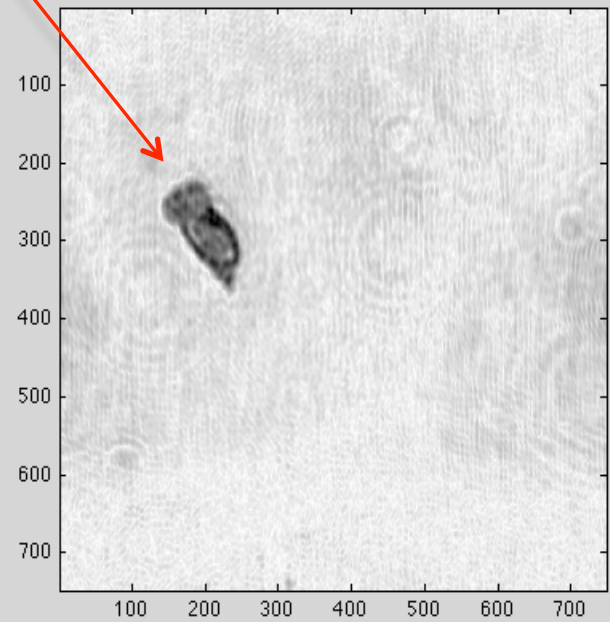
Exploring the limit of the setup

ZOOM

4x Digital lens

Conclusions

Holography in-line lensless advantages:
- compact setup
- DoF free

Holography in-line lensless disadvantages:
- not real time imaging technique
- technologies dependent